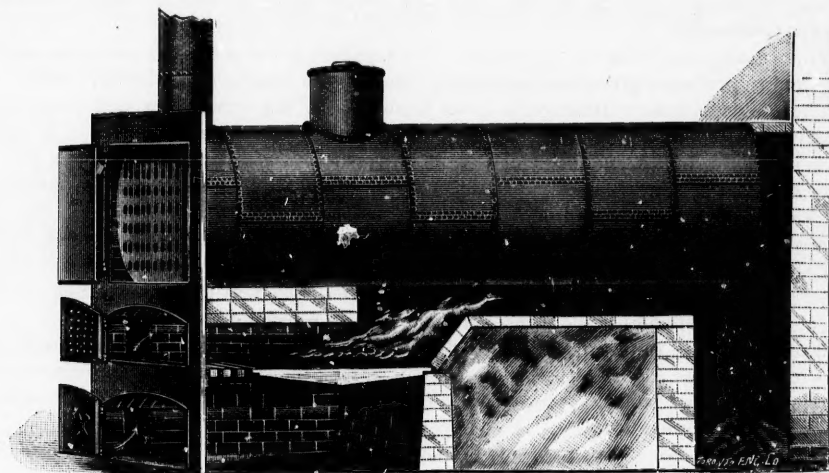


# CONSUME YOUR SMOKE



Save fuel, make friends with your neighbors, create healthy atmosphere  
in your boiler room, by applying

## "THE BACKUS PERFECT COMBUSTION FURNACE"

to your boilers; easily applied to any boiler, requires no attention from engineer or fireman, and guarantees to consume **NINETY-FIVE PER CENT.** of all gases and smoke.

**I** PRESENT HEREWITH a sectional view of the BACKUS FURNACE, with the side broken away so that its mode of operation may be the more readily observed. The great claim for the BACKUS FURNACE is that it ASSURES PERFECT COMBUSTION, which includes in its train economy of fuel, elimination of the smoke nuisance, a minimum of work for the fireman, and freedom from soot and cinders.

The commonly accepted construction of a furnace is to place a grate under the boiler, throwing thereon soft coal for fuel, and closing the door. The process of slow combustion melts the coal, which runs down and closes the apertures of the grate. This excludes the air and renders combustion imperfect, for the want of sufficient oxygen. By the introduction of a large volume of air the blacksmith with his bellows obtains perfect combustion in his forge. In a conflagration where the free presence of oxygen intensifies the flames, brick walls are melted. Hence by the introduction of a sufficient amount of oxygen in the ordinary furnace perfect combustion may be obtained. This is accomplished by introducing air through large ducts or flues built in the brick work at each side of the fire box in front, and by substituting grate surface in place of the ordinary or common door-sill, and by building a brick arch between the boiler and fire,—this arch abutting against the front and over the door, and extending into the furnace sufficient distance [depending on the length of the boiler], to heat the incoming air before it mixes or comes in contact with the escaping carbon or soot, and preventing the cold air meeting the boiler. The arch becomes intensely heated and causes the gases to ignite with the carbon, giving off a clean flame or perfect combustion at the inner end of the arch.

The *philosophy* of this furnace in brief is, that by the air ducts at the front a large volume of air is admitted, which, passing over the fire and under the red hot arch, unites with the carbon and creates a perfectly clean flame. There can thus be no deposit of soot in the flues or escape of

smoke through the chimney for the reason that both soot and smoke are consumed under the boiler, and thus, instead of a nuisance, are utilized as flame producers. By elongating and elevating the bridge wall the flame is made to hug the boiler, and a small pit at the rear end receives what cinders may escape combustion.

This furnace, according to testimonials, is recognized as the *fireman's friend*, as there is less coal required to perform a given amount of work, less ashes to remove, and no soot in flues.

The company hold a testimonial letter from Jas. H. Wade, Secretary and Steward of the University of Michigan, where nine of these furnaces are in operation, also from C. H. Buhl, J. J. Bagley & Co., Metcalf Bros. and others of Detroit, Michigan, and many others in different parts of the country; all speaking in the most unqualified terms of praise of the device, "so perfect in its working that nothing appears wanting."

Any ordinary furnace can be reconstructed with this arch and air ducts at small expense.

I have purchased the right to construct and use this furnace for the Dominion of Canada, and am prepared to give instructions how to construct the same, and will guarantee results, and sell the right to others to build and use the furnace for an equitable consideration.

They are applied to the boilers of the Rossin House, and I invite engineers, property owners members of the Council, and all others interested in having smoke consumed from factories, planing mills, and other chimney stacks where steam for power or heating is used, to call and examine the furnace in **practical operation**.

The cost of applying the furnace to ordinary boilers of 10 to 50 horse-power is from \$15 to \$25 each boiler.

The royalty for using the same is based upon the horse-power capacity of each boiler, during the life of the Patent, as follows:

From 1 to 14 horse-power	-	-	-	-	\$ 50 00
" 15 to 34 "	-	-	-	-	75 00
" 35 to 49 "	-	-	-	-	100 00
" 50 to 74 "	-	-	-	-	150 00
" 75 to 100 "	-	-	-	-	200 00

Special rates given to distillers, brewers and manufacturers, or public buildings having boilers of larger capacity, or a number of small boilers in one set.

Interviews and correspondence solicited.

**MARK H. IRISH**

ROSSIN HOUSE  
Toronto, Ontario, Canada

# TESTIMONIALS

## Furnace for Soft and Hard Coal.

AUBURN, N. Y., Nov. 13th, 1885.

THE BACKUS CO., DETROIT, MICH.

Gentlemen,—The Backus Furnace which we put under our boiler is working nicely, the more we use it the better we like it.

[COPY]

Yours respectfully,

E. J. MOSHER, Engineer.

MARINE CITY, MICH., March 9th, 1886.

THE BACKUS CO., DETROIT, MICH.

Gentlemen,—Yours of the 6th inst. received. We are giving the furnace a good fair test, and I don't see for my part how they can be bettered. For the twenty-four hours ending at 6 a.m. this morning we had consumed  $7\frac{1}{2}$  tons of coal, and the amount used without your furnace was 9 $\frac{1}{2}$  tons.

[COPY]

Yours respectfully,

GEORGE BUTLER.

DETROIT, MICH., May 28th, 1887.

THE BACKUS CO., DETROIT, MICH.

Gentlemen,—The application of your patent furnace, made the first day of January last, under our boiler has proved a success, and we are greatly pleased with it. We now make steam readily and burn our smoke perfectly, and we take pleasure in bearing testimony that you have a perfect and reliable smoke consuming and steam generating furnace, in our opinion the best in the country.

[COPY]

Yours respectfully,

METCALF BROS. & CO.,

Ira A. Metcalf, President.

COVINGTON, KY., June 4th, 1887.

THE BACKUS CO., DETROIT, MICH.

Gentlemen,—Yours of the 2nd to hand. The furnaces you put up for us are doing splendidly, and we have saved by measurement 15 per cent. of our coal. There is no mistake about this, as we have been very particular and have weighed it carefully. As to consuming the smoke, our chimney sends forth 95 per cent. less smoke than any of the hundreds of chimneys surrounding us. I am convinced that your furnace is the best by odds.

[COPY]

Yours respectfully,

CHAMPION ICE MANUFACTURING & COLD STORAGE CO.,

R. W. Dugan, Superintendent and Treasurer.

TORONTO, Dec. 16th, 1887.

M. H. IRISH, ESQ., ROSSIN HOUSE, TORONTO.

Dear Sir,—The BACKUS PERFECT COMBUSTION FURNACE supplied by you under the boiler in my Steam Laundry, York Street, is giving perfect satisfaction. It not only saves work for my engineer, by less firing and keeping the flues clean, but it consumes at least 95 per cent. OF THE SMOKE. We have great pleasure in recommending it.

GEORGE P. SHARPE,

106 York Street, Toronto.

## Furnace for Shavings.

CADILLAC, MICH., Jan. 24th, 1885.

THE BACKUS CO., DETROIT, MICH.

Gentlemen,—Your Base Burning Boiler Furnace under our two boilers is giving us perfect satisfaction. The combustion is complete, making, therefore, more heat from the same amount of fuel than any other style of boiler setting known to us. Before putting in your device we took considerable time in looking into the merits of several first-class boiler settings and furnaces, and yours looked to us to be the most economical and practical, so we adopted it. Our engineer does his own firing and has the easiest time of any of our men.

[COPY]

Yours very truly,

CUMMER & CUMMER.

DETROIT, MICH., Dec. 12th, 1887.

MR. MARK H. IRISH.

Dear Sir,—The Base Burning Furnace for light fuel, which we use in our Planing Mill, has been in constant use for past five years, and has proved of great utility, saving 25 per cent. of fuel, and one fireman being ample to run the four furnaces. We consider it thoroughly reliable every way, and would not think of using any other setting where shavings or light fuel is being used. It is nearly Perfect Combustion, and wonderful for generating steam rapidly, and we consider it superior to any furnace of which we have any knowledge.

Yours truly,

A. BACKUS, JR., & SONS.

[From the Chicago Daily Tribune, December 14th, 1887.]

### Looking at some Smoke Burners.

Yesterday morning Commissioner Thompson, Captain Dunham, of the tug company, Judge Van Higgins and representatives of the press, accompanied Mr. C. M. Johnson to the Chicago Burlington & Quincy yards to see his smoke-burning device in operation on a switch engine in the railroad yards.

Mr. Johnson has simply tried to improve the Hutchinson patent by forcing steam through several smaller jets than those used on the original patent, and that is the only perceptible difference.

While it will prevent much of the thick, black smoke, so will the Hutchinson and the other half a thousand steam-jet, hot-air devices, but it will not consume any greater percentage than the others, and therefore is no better.

It was given a thorough test yesterday. The fireman threw coal in the furnace, and when a thick volume of smoke began to roll from the stack the steam was turned on, and in a very short time the color of the smoke was considerably whitened and cleared, but not to the extent that is desired or expected of a perfect smoke-consumer.

Commissioner Thompson said it was no better than many others, and, while intended as an improvement on Hutchinson's patent, he thought that it was doubtful if it is as good a device as many others now in use in this city.

Judge Van Higgins, who has been making the smoke question a special study, had a very poor opinion of Mr. Johnson's invention, and thought it no better than many others now in use in Chicago.

The device at the National Insurance Company's building was examined at Judge Higgins' suggestion and was thought to be a good one of its kind—steam jet.

A. Backus, another inventor, has placed one of his consumers in the furnace at Slack's grocery store, at the corner of Wabash Avenue and Madison Street. In the afternoon a "Tribune" reporter, in company with Commissioner Thompson and the inventor, called to see it in operation. Mr. Backus claims that by the introduction of a sufficient amount of oxygen in the ordinary furnace, perfect combustion may be obtained. This, he says, is accomplished by the use of his device, which is simply the introduction of air through large ducts or flues built in the brick work at each side and the building of a brick arch between the boiler and fire. This arch abuts against the front and over the door, and extends into the furnace a sufficient distance to heat the incoming air before it mixes or comes in contact with the escaping carbon or soot, and prevents the cold air meeting the boiler. The arch becomes intensely heated, and causes the gases with the carbon to ignite, giving off a clear flame or perfect combustion at the inner end of the arch.

The fireman at Slack's filled his furnace full of fine coal, which ordinarily throws off smoke like a volcano, but not

the faintest show of smoke could be seen coming from that chimney, and no one could tell there was a fire in the furnace. **Commissioner Thompson gave it his endorsement.**

[From the Chicago Daily News, December 14th, 1887.]

### Testing a Smoke-Consumer.

Inspector Thompson an Interested Spectator at a Successful Exhibition.

A successful trial of the Backus smoke-consumer was made yesterday afternoon at Slack's wholesale grocery in the presence of Smoke Inspector Thompson, Charles Slack and a "Daily News" reporter. A fire was built of Indiana block coal slack, which usually makes a dense black smoke, and on top of this was thrown a barrel and a half of decayed apples and bananas, damp straw, and sweepings. An immediate rush was then made for the outside to see the smoke, but not enough was perceptible to discolor the cheek of a society belle. Col. Thompson, with the prospect in view of losing his job, laughingly threatened to haul the engineer up and fine him if he couldn't make a smoke.

This smoke-consumer has been in use two weeks, and Mr. Slack was much pleased with its workings.

"I have good reason to believe it a success," he said. "I am in favor of a burner which will do away with smoke without the aid of steam. This seems to do it satisfactorily."

"I tried my best to make it smoke," said Engineer Adams, "and I can't do it."

The principle of the furnace is simply that of perfect combustion through a plentiful supply of air. This is furnished by enlarging the grates, conducting air from the sides of the furnace, and decreasing the room in the fire-box by means of a brick arch.

[From the Canadian Manufacturer and Industrial World, Dec. 16th, 1887.]

MR. MARK H. IRISH, Toronto, has purchased the Canadian patent right to the Backus perfect combustion boiler furnace. The philosophy of this furnace is that by properly arranged air ducts at the front of the furnace a large volume of air is admitted, which passes over the fire and under an arch constructed of fire brick, which becomes intensely hot. The inflow of air becomes heated to a high degree, and, uniting with the carbon of the fuel, creates a clean flame. There is thus but little or no deposit of soot in the flues, or escape of smoke—unconsumed carbon—from the chimney. There are now two of these Backus furnaces in successful operation at the works of the Massey Manufacturing Co., and two in the Rossin House, one in George P. Sharpe's Steam Laundry, York Street, Toronto, of which inspection is invited. Several others are about being placed in establishments in the city using large quantities of fuel, regarding the success of which we will speak at another time.